

OBITUARY NOTICES

OF

FELLOWS DECEASED.

## C O N T E N T S .

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	PAGE
DAVID JAMES HAMILTON .....	i
WILFRID HUDLESTON HUDLESTON .....	vi
SIR GEORGE KING .....	xi

## DAVID JAMES HAMILTON, 1849—1909.

AFTER protracted illness, the death of Prof. David James Hamilton, M.B., LL.D., F.R.S., F.R.S.E., F.R.C.S.E., took place at his residence in Aberdeen on February 19, 1909.

The subject of this memoir was born sixty years ago at Falkirk. He received his medical education at Edinburgh University, from which he graduated as M.B. in 1878. He subsequently held several clinical appointments: two in Edinburgh, where he acted as House Surgeon in the Royal Infirmary, then as Resident in the Chalmers Hospital; a third in Liverpool, where he held a Resident Surgeoncy in the Northern Hospital. Even at this early period of his career he was strongly attracted towards pathological problems, for the study of which his thorough acquaintance with the physiology of that period formed an all-important basis. This predilection for a branch of medical science at that time much neglected, was happily confirmed when the Triennial Astley Cooper Prize was awarded him for a thesis dealing with "The Diseases and Injuries of the Spinal Cord," in which the result of much careful observation and research was embodied.

This mark of appreciation effectually determined Hamilton's path in life, and in order to acquaint himself more thoroughly with the thought and technique of other schools, he proceeded to the Continent, visiting Strassburg, Munich, Vienna, and Paris in succession. After thus spending two years in close contact with the leading European pathologists of the time, he returned home in 1875 on his appointment as Assistant to the late Prof. Sanders in Edinburgh University. Somewhat later he became pathologist to the Royal Infirmary, a post which furnished him with ample facilities for the prosecution of observation and research. At this time he organised a course on morbid histology, which was largely attended, mainly by young graduates, who were not slow in recognising the vigour, resource, and thoroughness of their teacher.

An even wider opportunity for studying the most effective methods of class instruction presented itself in the winter of 1880-1, when, owing to the ill-health of Prof. Sanders, necessitating the appointment of a temporary substitute, Hamilton found himself entrusted with the entire duties—educational and administrative—of the University Pathological Department.

Before the endowment of the Erasmus Wilson Chair in 1882, the University of Aberdeen had no teacher in pathology apart from the professors of Practice of Medicine and of Surgery, who did what the discharge of their more obvious duties permitted to remedy the deficiency. On his election as the first occupant of the Chair of Pathology, Hamilton naturally found that his resources were limited; it may be said that they were non-existent, for he inherited no department and but the scantiest equipment. But his enthusiasm and determination of purpose, coupled with exceptional physical vigour, fully qualified him to deal with the difficult

position, so that in a surprisingly short space of time he was presiding over classes of systematic and practical study in which his able and inspiring teaching was illustrated by a wealth of material, amongst which his models of pathological conditions, moulded and coloured to perfection, were marvellous counterfeits of reality. Practically all these accessories were prepared either by his own hands or under his direct supervision. Though his most pressing needs were satisfied for the moment, others speedily presented themselves. With the active development in bacteriology then proceeding, the requirements of pathological departments demanded an accelerated expansion; more experimental and teaching accommodation had to be found, apparatus to satisfy the needs of an elaborate technique to be procured, but by unfaltering effort Hamilton seldom failed in obtaining that which he deemed essential in order to keep his laboratories fully abreast of the requirements of the time. It would, in fact, have been almost impossible for those who presided over the University's coffer to have rejected the vigorous and conclusive appeals which he made to their liberality.

Hamilton's exceptional qualifications as a teacher were speedily recognised. They were endowments rather than acquirements. Some scientists with high versatility in observation and investigation possess a less conspicuous qualification for imparting their enthusiasm and information to others, but he was a born teacher whose clear incisive style, carefully ordered facts, and closely argued theories compelled the attention and conviction of his hearers. By some he has been styled dogmatic, but if he sometimes pronounced a decided judgment on a contested point, it was always preceded by a fair statement of the observations and theories of others. That his own views were decidedly and vigorously instilled, was no doubt a factor in the success of his method of instruction, in so far that the student was left with a perfectly clear conception of the standpoint adopted by his master.

Whilst his duties at Marischal College and at the Royal Aberdeen Infirmary (in which institution in his capacity as pathologist he had entirely remodelled the *post-mortem* department) occupied his time very fully, Hamilton was devoting much of his evenings to preparing his 'Text Book of Pathology' for publication. On its appearance in 1889, the book was received in most quarters with unqualified approval. It was recognised as being a thorough and comprehensive work of reference in the various aspects of pathological study, based on the teachings of physiology to ensure a due comprehension of morbid function, minute, clear, and practical in its details of conditions and methods, illustrated with an exactitude and skill unattainable except by those possessing not merely the requisite scientific knowledge, but an artistic temperament to perfect the delineation.

That all critics should be entirely satisfied with the work was naturally impossible: too little attention paid to the vital manifestations of morbidity, too much to structural abnormality, the experimental aspect of study unduly subordinated, these were amongst the strictures; but when the critic had sufficiently vindicated his own standpoint, he usually showed himself

constrained to praise much of the text and all of its illustrations. - It was no small assistance to Hamilton in this literary work that his earlier investigations had brought him into the closest contact with very various questions of a pathological character; he had not limited himself to a narrow field of observation, but had been truly catholic in his selection of objects of study. A recital of some of his chief contributions to pathology may illustrate this point.

In 1879 he commenced a series of very capable articles dealing with various morbid conditions of the lung. The papers appeared at brief intervals in the issues of 'The Practitioner' throughout a period of two years, so that the name of the author became familiar to medical man and specialist alike. (It may be mentioned that Hamilton particularly desired to accentuate the value of pathological study in its proper relationship to diagnosis and treatment.) Topographical knowledge of the central nervous system was enriched by his contributions on the conducting paths in the brain, and especially by his work on the corpus callosum in adult and embryonic conditions. (In prosecuting these researches he was assisted by a grant from the Royal Society.) In 1882 a communication was made by him to the Royal Society of Edinburgh, in which he dealt with a physical explanation of diapidesis, and illustrated his theories by novel and ingenious mechanism.

Much originality of idea, expressed with his wonted lucidity, is displayed in his studies relating to sponge grafting, and to embolic infarction, as well as in articles bearing upon such matters as the influence of heredity in disease, the pathology of gastric dyspepsia, and the alimentary canal as a source of contagion.

Hamilton showed a keen interest in the pathological conditions occurring amongst domestic animals, especially those which contribute to the food supply of man, and his later work in this direction is important, not merely from its bearing upon agricultural economics, but also as a practical addition to current knowledge of invasion and resistance. His inquiry into the relationship of human to bovine tuberculosis strengthened by its results his opposition to the views adopted by Koch, whilst his laborious investigation into the etiology, symptomatology, and prophylaxis of certain disorders occurring amongst sheep led to very interesting and valuable conclusions.

This—his last, and probably his most important work—must be referred to in some detail. The commencement of this inquiry is now remote, for it was in 1881 that Hamilton was sent to the Island of Skye by the Highland and Agricultural Society as the expert member of a committee charged with investigation of the disease known as "Braxy" (*morbus subitarius ovis*). The time of year chosen for the expedition proved unfavourable for this purpose. It was not until 1897 that Hamilton found himself able to resume the research: in that year he visited the Fort William district, with other localities where disease was rampant, observing the symptoms and topography not only of

braxy but of other members of the group of disorders with which it is frequently confounded by stock-masters and shepherds. From year to year these excursions to various infected areas were repeated with a similar object, and as their result, augmented by official information mainly derived from Ireland, he was able to settle and map out the topography of braxy. But this was merely a preliminary to the much more important work which was instituted by the Departmental Committee appointed by the Board of Agriculture in 1901, upon which Hamilton acted as chairman and expert. Plans of action were agreed upon and observation stations organised in localities where disease occurred endemically amongst sheep, the chief being located at Kielder, in Northumberland. The report of this Committee appeared three years ago in the form of a Blue book. It deals chiefly with braxy and louping-ill, though touching upon several other disorders which are held to be individually distinct. Hamilton fully confirmed the description of the braxy micro-organism, first recognised by Ivar Nielsen in 1888, and further, added several important observations relating to its seasonal activity and manner of invasion, together with a suggested method of prophylaxis. The louping-ill disease (*chorea paralytica ovis*) which had been a veritable mystery, was finally unravelled, the bacillus found, its characteristics under cultivation studied, its manner of development and invasion traced, its seasonal activity explained, a plan for protection against it elaborated and tested with most encouraging results. The pages of the report testify to the prolonged and arduous nature of a research which, step by step, led the way to an entirely satisfactory and practical issue. Apart from the information they contain bearing upon seasonal receptivity towards infection, the nature of intestinal infection, the duality of symptoms produced by the toxine originated by the same micro-organism, together with other matters which may have their signification for man as well as for the animals which Hamilton observed, the work has a direct bearing upon agriculture of a far reaching character. The need for similar investigation into other disorders of the sheep, which are touched upon incidentally in the report, is indicated; it was, indeed, Hamilton's intention to make a thorough study of these individually, but their elucidation was not to be at his hands.

The attachment of his former pupils was suitably shown in 1906, when, on the completion of his twenty-fifth year of service in the University, a volume of 'Studies in Pathology' was prepared in his honour, to which many old students, now professors and lecturers in other schools, were contributors. His jubilee coincided in point of time with the celebration of the quatercentenary of Aberdeen University. He appeared to be at that time in the enjoyment of his accustomed vigour, but not long afterwards symptoms of a disquieting character became apparent: exertion fatigued him, vigour of step and speech were less manifest, and although he only relinquished his work at intervals under pressing medical advice, it was evident that he was losing ground. By the end of 1908 he was confined to his room and unable to be present at the funeral of his wife when her decease occurred somewhat later,

Under the influence of this bereavement and the progress of his malady, Hamilton's condition became steadily worse ; he recognised the impossibility of recovery and resigned his Chair ; five months later, in the spring of 1909, death terminated his suffering.

As we have endeavoured to summarise the work of a lifetime, it is fitting that we should glance for a moment at the outstanding characteristics of the man who accomplished it. Hamilton possessed a strongly defined individuality, intense and ardent, firm in upholding a conviction, direct and enthusiastic in supporting it. Finesse, compromise, and ambiguity were alike foreign to his nature ; if he was frank and outspoken he was incapable of harbouring feelings of bitterness or resentment towards others who held different views. To his intimate friends there was a perennial freshness and geniality in the relationship : his keen sense of humour, interpreted by the expressive grey eyes and the musical infectious laugh, added to the charm of his company. Beyond his work he had wide interests and deep sources of pleasure ; he loved nature and keenly appreciated the artistic, whether in form or colour. On several occasions he lectured on artistic themes, architecture included, always exhibiting a fine enthusiasm for work which he recognised as harmonious and genuine. In music he was a connoisseur and was himself possessed of a melodious voice.

Hamilton was a member of many learned societies and bodies ; his election to the Fellowship of the Royal Society in 1908 and his laureation as LL.D. by his Alma Mater soon after, were tokens of appreciation which caused him peculiar gratification. Had he lived to the spring graduation of the current year he would have received a similar recognition from the University in which he had served with much distinction throughout a period of twenty-six years.

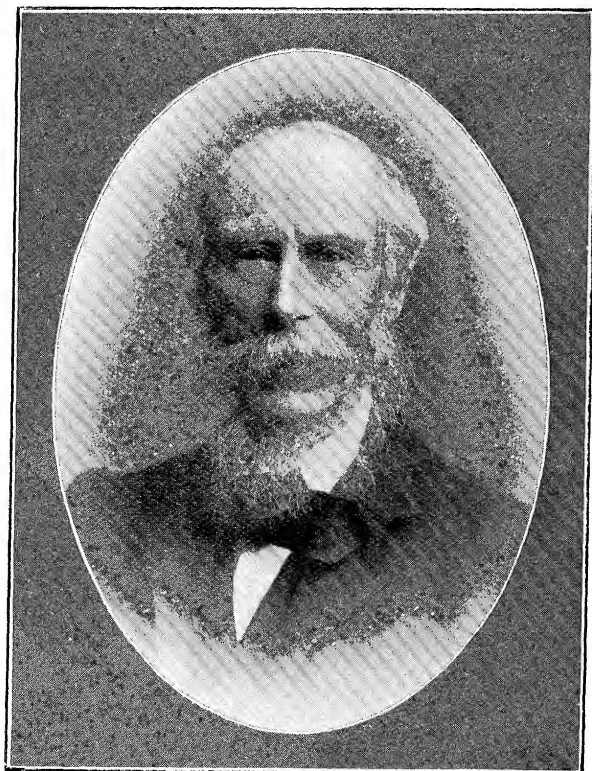
Hamilton was twice married : his first wife died seventeen years ago ; his second, a daughter of Mr. John Wilson, of Falkirk, predeceased him by a few months.

J. T. C.

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## WILFRID HUDLESTON HUDLESTON, 1828—1909.

IN the history of Geological Science two classes of individuals have, at various times, contributed to its advancement, namely, the amateur investigator and the professional worker. Of these the amateurs were certainly amongst the earliest in the field, and indeed it may be truly said



that, but for their labours, the initiation of the Geological Society and the Survey itself as a public department would scarcely have met with so early a reception in this country.

Thanks to our universities and public schools, well-trained professional workers have now become so numerous that there seems little room left for the amateur; nevertheless, so fascinating is the science that geology is still pursued with marked success by many private persons, purely *con amore* and often as a leisure hour pursuit or an agreeable concomitant of travel. Foremost amongst those non-professional geologists, who devoted his life for many years to

this science, must be placed the name of Wilfrid Hudleston Hudleston (formerly Simpson).

Born at York, June 2, 1828, Wilfrid Hudleston Simpson was the eldest son of Dr. John Simpson, of Knaresborough, and is, on his father's side, a descendant of three generations of Yorkshire "medicine-men." His mother, *née* Elizabeth Ward, was heiress of the Hudlestons of Cumberland, and in 1867, on succeeding to the family estates, Wilfrid, by letters patent, assumed the name of Hudleston, by which he is best known among geologists.

From 1831 to 1834 he resided with his parents in Harrogate, where his first playfellow was Henry Clifton Sorby—who afterwards became so distinguished a geologist and a President of the Geological Society of London.



Young Simpson received his early education at St. Peter's School, York, from which he was transferred to Uppingham School, and subsequently entered St. John's College, Cambridge, where he graduated B.A. in 1850. Up to this time, as a school-boy and an undergraduate, Wilfrid had evinced no special predilection for geology. In his last term he attended Sedgwick's lectures and was much impressed with the manner and appearance of that distinguished geologist. His earliest scientific pursuit was ornithology, commenced at fifteen years of age whilst still at Uppingham School. At Cambridge he was associated with Alfred Newton from 1848 and with J. E. Law, making many expeditions in Northumberland, Cumberland, and N.W. Ireland. Afterwards he visited the Norwegian coast and here he became acquainted with John Wolley (author of '*Ootheca Wolleyana*'), and with him he collected in Finland and Lapland, also with Alfred Newton and John Wolley in 1855 and in 1856 in the Island of Öland and Sweden.

In 1857 he joined Canon Tristram and Osbert Salvin in an ornithological expedition to Algeria. Together they explored the Eastern Atlas, visiting Tunis, Constantine, Kef, etc. The years 1859—60 were chiefly spent by Wilfrid Simpson in Greece and part of Turkey (the Dobrudscha, now Roumania). His last ornithological trip was made in 1861 to Switzerland.

On leaving Cambridge he devoted some time to the study of the Law and was called to the Bar in 1853, but never practised.

From 1862 to 1867 Mr. Wilfrid Simpson held a commission in the Kent Artillery (Militia), and performed yearly garrison duties at Dover Castle. About this time he also began a special course of scientific studies, selecting more particularly Natural History and Chemistry. He studied in Edinburgh under Playfair and Stephenson Macadam, and subsequently, for three sessions, at the Royal College of Chemistry in London under Hoffmann, Frankland, and Valentine. At that time he was uncertain whether to take chemistry or geology as his main subject of pursuit, when an accident decided in favour of the latter. In 1866 he met Marshall Hall at Chamounix and on their return to England he was speedily introduced to many persons interested in geological science, of whom Prof. Morris may be regarded as the chief.

Prof. Morris had a wonderful influence over his pupils and associates, and this was just the attraction which Mr. Simpson, who had now (1867) assumed the patronymic of Hudleston, required to enlist him as a geological recruit, and in due course to make him a "knight of the hammer" for the rest of his life. A close friendship was thus formed which was only terminated by the death of Morris in 1886.

In 1867 he was elected a Fellow of the Geological Society, and in 1871 a Member of the Geologists' Association. Of this Association he became Secretary in 1874, and during the three years of office he spent much time in preparing reports on the various districts visited, some of which are of considerable extent and importance. In 1872 he published his first original paper (with Mr. F. G. H. Price) "On Excavations at the New Law Courts."

His papers on "The Yorkshire Oolites" (1873—78) and "The Corallian

Rocks of England" (with Prof. J. F. Blake (1877)) soon established his reputation as one of our leading geologists.

Mr. Hudleston was elected President of the Geologists' Association in 1881, and his great services rendered to that body during so many years were marked, in March, 1892, by the presentation of an illuminated address.

From 1886 to 1890 he filled the post of Secretary to the Geological Society of London and, in succession to Sir A. Geikie, he was elected President (1892—94). In these years, in addition to his official duties both in connection with the Geological Society and the Geologists' Association, Mr. Hudleston proved himself an able and prolific contributor to the literature of geology. Some twenty papers were written by him on the field-geology of various districts, eight on Chemical Geology, for which he had always a strong predilection, dealt with the Lizard Rocks; the Gneiss Rocks of the N.W. Highlands; Sterry Hunt's Chemical Essays; King and Rowney's views on *Eozoon Canadense*; the Diamond-rock of S. Africa; and Sterry Hunt's views on Serpentine. In Palæontology he published Monographs on the Corallian Gasteropoda of Yorkshire (1880—81). The Gasteropoda of the Portland Rocks (1881) and of the Oxfordian and Lower Oolites of Yorkshire (1882—85), the Gasteropoda of the Inferior Oolite (1887—96), this latter comprising 514 quarto pages of letterpress and 44 quarto plates of fossils; a Catalogue of British Jurassic Gasteropoda (with Mr. E. Wilson), and papers on the Fossils of Western Australia and South Australia.

To this period must also be added Presidential Addresses to the Geologists' Association "On Deep-Sea Investigation" (1881), on the Geology of Palestine (1882, with additional notes in 1885), to the Malton Field Naturalists' Society (1884), and the Devonshire Association (1889); lastly, two Presidential Addresses to the Geological Society (1893—94), and one, later, as President of Section (C) Geology, British Association, Bristol (1898).

On the death of his old friend, Prof. Morris, in 1886, Mr. Hudleston succeeded him as one of the editors of the 'Geological Magazine,' to which journal, since 1879, he had been a frequent contributor, and continued so until his death in the present year. He was a keen student of recent and fossil mollusca and one of the founders of the Malacological Society.

In 1886, accompanied by Dr. Henry Woodward, F.R.S., and Mr. C. E. Robinson, M.Inst.C.E., he carried out some experimental dredgings, with a Brixham trawler and her crew, along the English Channel, and in and near Torbay, in order to study marine mollusca and observe their living habitats. In the following year he engaged a Grimsby steam trawler and her crew, and accompanied by Mr. C. E. Robinson and the late Martin F. Woodward, of the Royal College of Science, he spent three weeks in a dredging cruise in the English Channel and along the French coast.

Mr. Hudleston resided for many years in Cheyne Walk, Chelsea, but removed in 1883 to Oatlands Park, Surrey. This suburban residence,

however, interfered with his scientific engagements, and he again took up a residence in town at 8, Stanhope Gardens, South Kensington.

In 1890, he married Miss Rose Benson, second daughter of the late William Heywood Benson, Esq., of Littlethorpe, near Ripon.

Early in 1895, Mr. Hudleston, accompanied by his wife and his friend, Prof. J. F. Blake, F.G.S., left London for Bombay. After leaving Prof. Blake duly installed as Organising Curator of the Museum at Baroda, to which he had just been appointed, Mr. Hudleston journeyed onwards towards the north-west frontier of India. The geological results of this expedition are embodied in "Notes on Indian Geology," read before the Geologists' Association in December, 1895 (see 'Proc. Geol. Assoc.,' vol. 14, p. 226, 1896).

He presided over or took part in the Councils of numerous scientific societies. He was elected, in 1889, President of the Devonshire Association for the Advancement of Science, the Yorkshire Naturalists' Union, and the Malton Field Naturalists' Society; and had been for years a Vice-President of the Dorset Natural History Field Club. He also served as a Member of Council of the Royal Geographical Society, and as President of the Geological Section of the British Association at Bristol in 1898.

In 1897, Mr. Hudleston was awarded the highest honour which the Council of the Geological Society could bestow, namely, the "Wollaston Gold Medal," in recognition of his valuable contributions to our knowledge, including chemical, mineralogical, palæontological, and stratigraphical geology. Special reference was made by the President, Dr. Henry Hicks, F.R.S., to his monograph on "The Inferior Oolite Gasteropoda," contained in the volumes of the Palæontographical Society, which, with the services of four collectors in the field and in cleaning, developing, etc., occupied a period of over twenty years, the descriptions filling 514 quarto pages of letterpress and 44 quarto plates of figures. This fine collection of types has, since the death of Mr. Hudleston, been transferred, as a gift, to the Sedgwick Memorial Museum, Cambridge.

Two later papers deserve special mention, namely, the investigation of the structure of "Creechbarrow in Purbeck" ('Geol. Mag.,' 1902—3), and that "On the Origin of the Marine (Halolimnic) Fauna of Lake Tanganyika" ('Geol. Mag.,' 1904).

In his earlier years, before he became known as a geologist, he took a keen interest in ornithology, and was instrumental in founding, in 1858, in conjunction with the late Prof. Alfred Newton, of Cambridge, Mr. John Wolley, and others, the British Ornithologists' Union; and so lately as December 9, 1908, they commemorated the Society's fiftieth anniversary. To mark the occasion, the Society presented a gold medal to each of the four surviving original members, of whom Mr. Hudleston was one.

In connection with the Armstrong College, Newcastle (in the University of Durham), Mr. Hudleston provided the site and advanced capital for erecting a Marine Biological Laboratory at Cullercoats, Northumberland, to be named the "Dove Laboratory" (after a great ancestor of his family, Eleanor Dove).

It was erected and equipped at a cost of £4000, and was opened in July, 1908, by the Duke of Northumberland. The building is suitably provided with a fine aquarium with numerous tanks, and a large room on the ground floor where experiments on pisciculture may be conducted under improved conditions. It has, in addition, a library, a lecture room, workrooms, etc. The Director is Prof. Meek, M.Sc., under whose direction the entire equipment of the building was carried out.

Mr. Hudleston was a Justice of the Peace for the West Riding of Yorkshire and for East Dorset. He purchased the East Stoke Estate in 1897, for the sake of the shooting, having all his life been a keen sportsman. His latter years were divided between West Holme, Wareham, and his town residence, 8, Stanhope Gardens. He died at West Holme, January 29, 1909, in his eighty-first year.

Mr. Hudleston's life was marked by untiring energy, directed with a steady purpose throughout. As a man of science, may be mentioned the numerous offices he held in connection with the Geological Society, the Geologists' Association, and many other bodies. No fewer than 58 memoirs and papers, extending over a period of 32 years, attest to his energy and ability.

As an ornithologist and a traveller he accomplished much. During his sojourn in the East he acquired a fluent knowledge of modern Greek as well as Arabic. As a magistrate and a landed proprietor he was always earnestly desirous to fulfil his duties; while as a sportsman, both with gun and rod, he exhibited the same keenness as with his geological hammer or in his chemical laboratory and museum.

For many years Wilfrid Hudleston lived much alone, having but a small number of intimate friends: Prof. Morris, F. G. Hilton Price, Henry Woodward, H. W. Monckton, and some few others. Hence the social side of his life was never fully developed. But his earliest ornithological friendships for Prof. Alfred Newton, John Wolley, O. Salvin, Canon Tristram, and J. E. Law remained the strongest and warmest throughout his life, and were only separated by death and as he drifted apart from them in his later geological pursuits.

H. W.

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## SIR GEORGE KING, 1840—1909.

GEORGE KING, the only son of Robert King and Cecilia Anderson, was born at Peterhead, where his father was a bookseller and his maternal grandfather was Collector of Inland Revenue, on April 12, 1840. While King was still a child his father moved to Aberdeen, and joined in partnership his elder brother George, a bookseller in that city, where another brother, Arthur, founder of the Aberdeen University Press, was a printer. Partly in conjunction with this press, the firm of G. and R. King developed a publishing business which rendered good service to the north-east of Scotland at a time when difficulties of communication delayed supplies of literature from London, or even from Edinburgh. The partners were members of a family of Independents, a denomination never numerous in Scotland. Both were men of strong character and much ability, and took an active part in promoting the interests of the Congregational community. The senior partner, George, belonged to the Scottish Society of Antiquaries, and was one of the three founders of a still flourishing local Liberal newspaper.\* He was for forty years closely connected with the administration in Aberdeen of the Scottish poor-law, and published an essay on "Modern Pauperism" which attracted the attention of social statesmen fifty years ago. He also wrote an historical review of the origin and condition of the Congregational churches in Aberdeenshire and Banffshire, in which, while holding the views of an Independent as regards the organisation of the Anglican Church, he found the Presbyterian form of church government equally unjustifiable on historical grounds. The junior partner, father of the subject of this notice, was the author of a meritorious historical work, 'The Covenanters in the North,' published in 1846, shortly after his death from phthisis, at the early age of thirty-six, in November, 1845. As an Independent, the author was able to handle his subject with sympathy, and at the same time without the bias so often apparent in Presbyterian writings. King's mother died, also of phthisis, at the age of forty, in June, 1850.

Left an orphan at ten, King became the ward of his uncle George, who in the autumn of 1850 transferred him from the preparatory academy he had hitherto attended, to the Aberdeen Grammar School, then under the rectorship of Dr. Melvin, one of the foremost classical schools in Scotland. Two pupils named King, were already there, one in the fifth, another in the second class; the subject of this notice on entering the first class, taught by Mr. (afterwards Sir William) Geddes, was therefore, to the masters, King "tertius," to his schoolmates "Tertius" for short; this agnomen stuck to him till his

\* Arthur King, of the University Press, also engaged in newspaper enterprise, and became proprietor of the first penny paper published in the north of Scotland.

undergraduate days. At school "Tertius," in spite of constitutional delicacy, was an apt pupil; his guardian, partly on this account, partly because of the boy's poor health, decided to train him to be his successor in the firm, and effect was given to this design when King left school in 1854. The experiment did not succeed as his guardian had hoped, though it cannot be said that this effort to determine King's career was altogether thrown away.

Contemporaries of King who survive recall the proceedings of a literary society connected with the church to which his uncle belonged. Young King, while in business, was a leading member; his contributions to the discussions, we are told, showed erudition and insight beyond his years. The society subscribed for papers then rarely seen in Scotland; among them the 'Saturday Review,' for which King developed an especial liking that, except when the paper was edited by F. Harris, he retained to the last. It may be noted that when, later in life, King left the Independent community, he transferred his allegiance to the Anglican, not the Calvinist, Church. Not improbably King's sympathies with literature and art, and his practical outlook on life, may have been paternal inheritances. But it is clear that this association with a bookselling and publishing business aided in developing his keen and sure taste, so appreciated by intimate friends, so unsuspected by others. Nor can it be doubted that his instinct for the essential, his mastery of complex detail, and his genius for organisation, which combined to render his public services so valuable, benefited by their exercise during the apparently fruitless and certainly irksome years of King's business life.

With the utmost affection and regard for his uncle, King never threw his heart into the business of the firm. As a small boy he had shown, in country walks with his father, all the interest of a child in birds and flowers with more than the usual power of remembering their names and peculiarities. But in the absence of parental stimulation and in spite of delicate health, this interest in natural objects, in place of being inhibited by the literary drill of a classical school, gradually developed into an overpowering taste for scientific study in general, and for zoological and botanical pursuits in particular. His innate ambition was to be a naturalist; his accidental attachment to a business failed to suppress his devotion to natural study. His spare time was given to field excursions; his enthusiasm gained him the "freedom" of the arcana of local nurserymen. His pursuits led King to introduce into the business premises specimens in which he was interested. These his uncle contemptuously termed "scroggs"; King's addiction to their study caused the worthy man genuine grief and much indignation. After his eighteenth year King's general health greatly improved, and it was clear that the situation could not persist. King continued in business until he reached his majority, but immediately thereafter he announced to his guardian his decision to devote what remained of his patrimony to acquiring a medical education, then the only avenue to a scientific career. His uncle, so far from expressing surprise, gave his approval to this decision, and thereafter did all in his power to further his nephew's designs. The

relationship between the two men was perhaps more sympathetic after King entered the University of Aberdeen in 1861 than it had been before.

King's gift of lucid expression and his aptitude for business may, like his instinct for literature and art, have been paternal inheritances. The origin of his faculty for observation seems more obscure. It may have been derived from the maternal side, for among his undergraduate contemporaries was a relative,\* in whom, as a boy, the love of natural history was also strongly developed, though in this instance the capacity for close and accurate observation was ultimately applied in a somewhat different field.

How distinguished as a student King proved, may be gathered from the fact that his contemporaries, after his first medical session, changed the old agnomen "Tertius" to "Optimus." The improvement in health which had begun in his eighteenth year continued; he had still to exercise unusual care, but the close of his university curriculum found him in more robust health than at its commencement. His capacity attracted the attention of all his teachers; those who exercised most influence upon him were the Professors of Botany (Dickie), *Materia Medica* (Harvey), and Anatomy (Struthers). King attended Dickie's class in 1861, and in 1862, when Dickie was incapacitated by illness, King was assistant to the deputy-professor, Dr. Dickson.† In 1863, when Dickie resumed work, and again in 1864, King continued to be assistant in the botanical department, and the attachment of the two men only ended with the death of the gentle and distinguished Dickie in 1882. The question as to the career King should adopt already exercised his chief and himself. King's predilection was towards cryptogamic botany; this was no doubt encouraged by so able an algologist as Dickie, who applied for counsel to Sir W. J. Hooker. Hooker's suggestion was that King should follow the example of his son, Dr. (now Sir J. D.) Hooker, and join the Naval Medical Service. But, while studying *Materia Medica*, Royle's 'Manual' led King to that author's other works; these, with Thomson's 'Narrative' and Hooker's 'Journal,' induced a desire to serve in India. There seemed little hope of this, recruitment of medical men for India having been suspended since 1860. But in April, 1865, the Indian Medical

\* Dr. James Rodger, whose father was an able mathematician and a successful man of business, and whose mother was a sister of King's mother, was one of King's class-fellows as a medical student. He graduated in 1865 along with King, and, like King, with highest academical honours. An accurate anatomist and a sound pathologist, Rodger was Senior Demonstrator of Anatomy under Prof. (afterwards Sir John) Struthers at Aberdeen from 1866 till 1871, and was Pathologist to the Royal Infirmary there from 1869 till 1886, when he was appointed a physician to the institution, and continued a member of its staff until his death in 1900. But the evidence is not conclusive; we must assume that King's father was at least capable of appreciating his child's interest in natural history, and we know that Rodger's father was an intimate friend of Prof. Dickie, F.R.S., enjoyed a considerable reputation as a local botanist, and took a keen interest in scientific matters generally.

† Alexander Dickson, afterwards Professor of Botany at Trinity College, Dublin (1866), Glasgow (1868), and Edinburgh (1879).

Service was reopened and a son of Prof. Harvey, already in a sister service,\* threw up his commission and entered the Indian one. King decided to follow young Harvey's example; after attaining his M.B. in 1865, he joined the Indian Medical Service on October 2 of that year, and having spent the winter at Netley, left for India in the following March. Before embarking King paid a visit to Kew, and on the voyage was able to render the earliest of his many services to that establishment and to India. Dr. Hooker entrusted to his care the first medicinal Ipecacuanha plant sent to India; this King delivered in safety at the Royal Botanic Garden, Calcutta, when he reached that port on April 11, 1866.

On landing, King was attached to the General Hospital, but on May 9 he was transferred to the Medical College Hospital, Calcutta, and was appointed house surgeon there on May 18. This post the principal advised him to resign on August 20; in the performance of his duty he had contracted fever, followed by an attack of pneumonia, which endangered his life and threatened to light up the phthisical tendency of his boyhood. Already his work had commended him to his seniors, who used their influence to procure his transfer to the drier and healthier climate of Upper India. He was posted to military duty on August 29, and reached Agra on September 4, when he was attached to the 41st Bengal Infantry. On December 13, 1866, he again fell ill, and on returning to duty was given medical charge, on January 9, 1867, of the civil station of Muttra; but a month later his administrative chief, again with the object of promoting his recovery, procured his transfer to the still drier climate of Central India, where, on February 17, he took over medical charge of the 1st Central India Horse at Goona. This post he held till December 4, when he was transferred to the Political Department in Rajputana, taking up his duties at Deoli, in Marwar, on December 24, 1867. During the following year he served there and at Mount Abu, and afterwards at Jodhpur, but early in September he was selected to officiate as Superintendent of the Botanic Garden at Saharanpur, a post which he filled from December 9, 1868, till November 22, 1869. As his temporary appointment at Saharanpur drew to an end, King found himself at the parting of the ways. His energy and ability impressed all those with whom he came in contact, and some glimpse of his organising faculty had been given in connection with famine work in Rajputana. The medical authorities were anxious to secure his services as a Deputy Sanitary Commissioner, and orders to take up civil medical duty on his relief at Saharanpur were issued. But the chief political officer in Rajputana had been equally impressed, and, having learned that the Forest Department was in need of competent officers, strongly advised the Conservator in the North-west Provinces to ask for King's services. King was accordingly invited in September, 1869, to accept an Assistant Conservatorship. The forest appointment offered greater scope for the utilisation of his botanical

\* Dr. R. Harvey, C.B., D.S.O., subsequently Director-General, Indian Medical Service, in which capacity he died at Simla, Panjab, December 1, 1901.



knowledge, and was accepted by King, who was thereupon placed in charge of the Dehra Dún forests, taking up his new duties on December 3, 1869.

At Agra, Muttra, and Saharanpur King laid the foundation of that knowledge of the plants of the Upper Gangetic Plain, shown in a contribution by him to the 'N.W. Provinces Gazetteer.' At Goona the flora of Central India did not suffice to occupy all his leisure; the balance he devoted to an ornithological survey of the district and to the preparation of a series of skeletons for the anatomical museum of his university. This work he continued in Rajputana, where he also made large botanical collections, investigated the plants used as food in times of scarcity, and studied the vegetation from what is now termed the oecological standpoint. At Saharanpur he found time, amid his administrative duties, for morphological and economic botanical studies.

The forest work at Dehra Dún gave King freer scope for the display of his powers. Zeal, energy, and candour were in him combined with a charm of manner which attached to him those with whom he had dealings. He could direct without damping the enthusiasm of those who served under him, while commanding the confidence of those under whom he served. Honest difference of opinion he seemed to find attractive; his anger never was provoked save by attempts at intrigue or subterfuge. These qualities were sorely needed in the Assistant Conservatorship with which he was entrusted. The situation he had to face is disclosed in a 'Memorandum on the Dehra Dhoon Government Forests,' presented to Government in April, 1871. To help him in his task he had been invested with the powers of a subordinate magistrate of the first class within forest limits on March 18, 1870; in performing it he virtually saved these forests from extinction. The nature of his achievement during the fifteen preceding months may be gathered from a judgment delivered on May 21, 1871, of which the following passage forms part:—"I do not think it would be right of me to close this case without putting on record some expression of opinion regarding the zeal displayed by Dr. King, and the debt which the Forest Department owes him. For years a most complete system of bribery and corruption had been going on in the Forest office; Government property to the value of thousands of rupees had been yearly stolen with the connivance of the Forest officials. Dr. King had hardly been in office a month when he saw how affairs stood, and before the end of six months he had obtained convictions against the principal offenders. The amount of labour Dr. King had to go through to obtain this satisfactory result is beyond belief. Day and night he never rested; through the most impenetrable jungles in the most unhealthy season he forced his way. No man, woman, or child who could throw any light on the subject was left unseen and unquestioned; once he got a clue he never let it drop; account-books and papers sent into the heart of foreign territory to be beyond grasp he ferreted out and laid before the Court. The result is that he has thrown light on all the most secret transactions. The character of all the officials in the Forest Department has been clearly

portrayed; the various ways Government had hitherto been defrauded and robbed have been found out and exposed; if Dr. King's successors do not take advantage of this it is their fault. The benefit which should accrue to the Forest Department by Dr. King's labour, if followed up in a proper spirit and with ordinary energy, is incalculable."

Little more than a year after joining the department King was appointed, on January 28, 1871, to officiate as Additional Deputy Conservator in charge of the Kumaon Forest Division, and on March 2 he was recommended for permanent promotion to this higher grade. While acting as Deputy Conservator King was ordered to prepare a "Report on Forest Conservancy, etc., for Raneekhet," one of the N.W. Himalayan hill-stations. This report he submitted in June, 1871, and its nature may be gathered from the 'Gazette' of India for September 9, which officially states: "That the Governor-General in Council has read Dr. King's very interesting report with great satisfaction, and cordially endorses the praise bestowed upon it by His Honour the Lieutenant-Governor. The recommendations contained in it are excellent, and His Excellency in Council trusts they will be borne in mind and carefully carried out." King further made a careful study of tea-pruning under the conditions that prevail in the Kangra Valley, and although it had reference primarily to the N.W. Himalaya, a successful tea-garden manager in N.E. India once remarked of King's paper that "before reading it he had pruned with his hands, after its perusal he could prune with his head." During his forest service King formed extensive botanical collections, and was acquiring the knowledge displayed afterwards in his 'Gazetteer' "List of the Plants of Garhwál, Jaunsár Bāwar, and Dehra Dūn."

The recommendation that King should be made a permanent Deputy Conservator was accepted by Government. Owing, however, to there being no vacancy in the N.W. Provinces, this promotion, it was decided, must involve his transfer to Burma. But before this arrangement could be carried out King's forest service came to an end. Dr. Thomas Anderson, Superintendent of the Royal Botanic Garden, Calcutta, and of Cinchona Cultivation in Bengal, fell a victim, in 1869, to the energy and zeal with which he had for years been labouring to establish plantations of cinchona in Sikkim. He had to be invalided to Europe, where he died in October, 1870. On March 10, 1871, the Secretary of State for India selected King as successor to Anderson (India Office despatch, March 23; Government of India Order, May 22). On being relieved of his forest duties King left for Calcutta and entered on his new charge, which included the Professorship of Botany in the Medical College of Bengal, and where the tasks before him were heavy ones, on July 10, 1871.

Two cyclones of extreme severity which swept over Calcutta in 1864 and in 1867 had ruined every park and garden in the neighbourhood. The Botanic Gardens, formerly famed for possessing one of the finest collections of trees in the East, had been reduced to a comparatively naked plain,

thoroughly exposed to sun and wind, and therefore favourable to the growth of rank grasses which smothered the young trees and shrubs planted to replace the uprooted veterans. Roads and paths were insufficient in number and unsatisfactory in condition and alignment. The site of the garden, being part of the rice-swamp which forms the Gangetic delta, was far from suitable to the successful cultivation of many desirable indigenous and exotic species. The residences of the garden employés, native and European alike, were inadequate and insanitary. The accommodation for the herbarium and library was cramped and inconvenient; the herbarium collection, though extensive, was very unequal. The labours of Roxburgh, Buchanan, and Wallich from 1793 to 1828 had brought together the richest botanical collection hitherto made in Asia. But in 1828 this collection was taken to Europe, and Wallich, then on leave in England, dispersed it on behalf of the East India Company with a generosity so lavish that nothing was left for the institution at whose cost and on whose behalf it had been formed. Something was done to repair this injury by Wallich himself on his return (1832—46), by Falconer (1846—54), by Thomson (1854—59), and by King's predecessor Anderson (1859—69), while the generous aid of Kew had provided Calcutta with a substantial share of the contents of the East India House cellars. But great leeway had still to be made up in order to render the Calcutta Herbarium commensurate with the needs of so important a botanical centre.

The problems connected with cinchona were of equal importance and of even greater difficulty. The Sikkim plantations, begun by Anderson ten years before, and pushed on with a zeal which cost that indefatigable officer his life, were an established fact when King assumed control. The policy of Government had been to act, as in the case of tea, only as a pioneer. So soon as it could be shown that private growers were in a position to undertake the enterprise, Government was prepared to dispose of these experimental plantations and retire from the field. In the case of cinchona this policy could not be carried out. The experience of these ten years had proved that in spite of every encouragement and assistance, the cultivation of cinchona in Northern India is, owing to natural causes, unprofitable to private enterprise. Government itself had therefore to attempt the economic separation, from the bark produced on its own plantations, of the alkaloids this bark contained, and to utilise these alkaloids in combating the ravages of malaria. Attempts in this direction had been made before King assumed charge; these attempts had not been attended with success. But there was another equally important problem to be dealt with. The bark of those cinchonas that had so far been most successfully grown in Sikkim and that were therefore chiefly represented in the Government plantations, is bark that, while rich in total alkaloids, is relatively poor in quinine, the most important of these alkaloids. It was therefore King's ambition to replace the kinds then most largely cultivated by others whose bark is rich in quinine, and eventually to separate this quinine in such a manner as to obviate financial loss to Government. With

characteristic energy King attacked these problems: as regards the first, urging the employment of a competent quinologist; as regards the second, himself attempting its solution on the spot. His zeal almost involved him in the fate that had befallen Anderson. Exposure and fatigue during his work on the plantation induced severe illness, which became aggravated while on an official visit to the Madras plantations in July, 1872. He developed symptoms of phthisis, and from July 16 was placed on the sick list at Coonoor. A month later his condition was so serious that he was invalided to Europe, and his friends hardly ventured to anticipate his return. After a year, spent mostly on the Riviera, his health, however, became so improved that he was able to resume his duties on November 5, 1873.

In 1874, King obtained the approval of Government for the improvements required in the Botanic Gardens as a scientific centre and a place of public resort. His designs involved prolonged work and considerable outlay. The funds required could only be gradually allotted; that they were granted at all gives ample proof of the enlightened liberality of the Bengal Government and the confidence which King's administrative gifts inspired. During the next nine years the Gardens were practically reconstructed. By excavating a series of lakes and ponds, so designed as to produce a variety of pleasing effects, sufficient soil was obtained to raise the level of the whole of the grounds. These sheets of water were connected by underground pipes, and the whole system was so arranged as to be kept at a uniform level by pumping water from the contiguous river. Many footpaths and carriage roads were laid out so that visitors can drive to any part of the garden. Elegant conservatories and a noble palm-house were built. New potting sheds, tool stores, and propagating pits were supplied and good dwelling-houses were provided for the members of the garden establishment both native and European. A handsome fireproof herbarium, on the lines of that at Kew, was erected to accommodate the rapidly-growing collection of dried plants and the valuable library. Minor improvements were added in subsequent years, but by 1883 the heaviest of King's garden work was over.

While effecting these improvements, King steadily added desirable species, indigenous and exotic, to the collections of living plants. Whenever this was compatible with the health of the plants and the production of pleasing effects King arranged his species with regard to their affinities, so that one part of the great garden can boast its fine palmetum, pandanetum, bambusetum; elsewhere other natural groups are similarly treated. But King had all the horror of the true lover of plants for a pedantic arrangement of species in rectilinear blocks according to what are conventionally termed natural families and regardless of the conditions suited to particular species. The first duty of a gardener he held to be the proper culture of his plants; the needs of the species grown, not the pragmatism of the methodist, were his chief consideration. Here and there he aggregated with the happiest results groups of species from some particular geographical area, thus reproducing plant associations which, though unmeaning except from

the artistic standpoint to the average European, are readily appreciated by intelligent native visitors. His operations were controlled with a singular prescience for ultimate effects and his years of unremitting toil were amply rewarded. The whole place bears the impress of King's influence and care, and the charm and beauty of its lakes and groves, its avenues and lawns for which the Royal Garden at Calcutta is now so justly famed, serve as an adequate memorial to his energy, patience and skill as a landscape gardener.

King's work in the Botanic Garden by no means exhausts his achievements in this direction. Shortly after his return to India in 1873 the amenities of Calcutta were enhanced by the addition of a zoological garden. King was appointed an original member of its Committee of Management, the Lieutenant-Governor in person serving as President. The site selected was occupied by a collection of miserable native huts; in a few years, under King's skilful guidance, it became one of the most attractive public resorts in India. Very soon afterwards the site of a summer residence for the Lieutenant-Governor was acquired at Darjeeling. The demesne in which the mansion stands was laid out under King's eye and the consummate art with which he employed the constituents of a natural forest and blended the effects produced within the area treated with those to be obtained from adjacent hill slopes and distant views has rendered these grounds at once the ideal of what such a place should be and the despair of those who would repeat the results. Again, in 1879, when, with the help of private munificence, Government was able to provide at Darjeeling a temperate annexe to the Botanic Garden at Calcutta, King was given administrative charge of this new garden. By a combination of the methods employed for the "Shrubbery" grounds at Darjeeling with those applied to the Zoological Garden at Calcutta, King in a few years created another place of public resort at once beautiful and instructive.

When King resumed charge of the Cinchona Department in 1873, he found that a quinologist had been appointed; he was, therefore, for the moment relieved of his anxiety with regard to factory operations. The officer appointed, Mr. C. H. Wood, devised a satisfactory method of extracting the mixed alkaloids from cinchona bark, and to King fell the delicate duty of creating a market for the resulting product, known as Cinchona Febrifuge. He brought to this task all the qualifications of an expert business man, surmounting every difficulty, and firmly establishing the distribution of the article on commercial, as opposed to eleemosynary, lines. But on October 13, 1877, Wood was transferred to Calcutta and King was placed in administrative charge of the factory, and in August, 1879, Wood, for domestic reasons, resigned Government service. When Wood retired he had not yet devised an economic method of separating quinine; he had, however, left his process for extracting febrifuge in excellent working order. In Mr. J. A. Gammie, the resident manager of the plantation, King had an able and resourceful lieutenant, who had worked in conjunction with Wood and was thoroughly competent to conduct Wood's febrifuge process.

Difficulties due to natural causes at first impeded King's substitution of the cultivation of yellow, or quinine-yielding, cinchonas for that of red cinchonas, in which the proportion of quinine is low. But for the skilful co-operation of Gammie these difficulties must have proved insurmountable, though, great as they were, they proved trifling as compared with other difficulties which only the confidence that he inspired in his immediate superiors enabled King to defeat. From the same source came difficulties connected with manufacture. When Wood resigned the quinologist's post in 1879, King had been deputed to Java to study the working of the Dutch cinchona department in that island. When he returned to India, on December 5, 1879, King found himself appointed to act as his own quinologist. The situation, for one whose passion was for thorough work and yet who was not himself an expert chemist, was full of difficulty; but the situation had to be faced, and he faced it with courage. Wood, after his return to England, took the keenest interest in the work, striving in his own laboratory to master some economical mode of obtaining quinine, while Gammie made trial of his suggestions on a commercial scale in the factory in Sikkim. Eventually King himself conducted to the ultimate success. He spent the summer of 1884 on furlough in Europe. Botanical studies on which he was engaged necessitated a visit to the Dutch herbaria. While in Holland he acquired some valuable information as to a process for separating quinine, which he at once made known to Wood, who was thereby led to devise a process more hopeful than any previous one. Gammie was able to visit England on furlough in 1885; he studied the details of the new process in Wood's laboratory, and on his return to India found that it was practicable on a commercial scale. The separation of pure quinine on the spot without involving financial loss to Government was at last possible, and by the end of 1887 a factory had been established and the manufacture of quinine on commercial lines was in full operation. In reporting this event, King was content to recount "the generous way in which Mr. Wood, without any pecuniary reward, initiated and invented it [the process] in his private laboratory, while Mr. Gammie perfected it in the Government factory. Without Mr. Wood the process would not have been invented, while without Mr. Gammie it would not have been successfully applied to manufacture."

The achievement was, after all, only a step towards the realisation of the original design of Government to supply the people of India, on a self-supporting basis, with quinine at a nominal cost. The attempt to supply the article on an eleemosynary basis had, indeed, already been made, police outposts being utilised as the distributing agency. But this humane effort was promptly defeated by small capitalists, who bought up the whole supplies as soon as these reached the various outposts, in order to resell the drug at a handsome profit and yet at rates which undersold the regular vendor. A firm of European merchants, inspired partly by genuine philanthropy, partly by a legitimate desire to extend their business, had also essayed the task, but had been compelled to abandon it, owing to the impossibility of organising a

reliable distributing agency. Clearly, therefore, no special agency could be economically created: some already existing one must be utilised. Clearly, too, the drug must be sold at a rate which, while securing Government against loss, should at the same time eliminate temptation on the part of outsiders to exploit the humanity of the authorities. King saw at a glance how the desired result might be attained, but the confidence he inspired in Government was not in itself sufficient to ensure the success of his design, which demanded not only the consent but the enthusiastic support of other heads of departments. In gaining this support the charm of his personality was as effective as it had been in securing the co-operation of his colleagues. The scheme involved the sale at every post-office of Government quinine, made up in doses of five grains each. Each dose was to be enclosed in a neat sealed packet. Each packet was to be sold for one farthing, and, together with brief instructions in the various vernaculars, was to bear the Royal Arms as a guarantee of genuineness. To encourage postal officials to push sales, a small commission was to be allowed, and facilities for replenishing stocks were to be offered. To eliminate the risk of adulteration and pilfering, the making-up of the packets was to be entrusted to the Prisons Department, who would receive the quinine in bulk direct from the Cinchona stores. In perfecting the scheme, King worked in co-operation with the Financial Secretary to Government, Mr. (now Sir Herbert) Risley. But the Postmaster-General for Bengal, Mr. Kisch, devised the procedure regulating the actual sales; the ingenuity of the Superintendent of the Alipur Jail, Mr. Larrymore, hit upon a method of cheaply, rapidly, and accurately dividing the quinine into doses, and the expert advice of the Government Printer, Mr. Lewis, guided the details connected with the preparation of the envelopes. The success of the scheme depended on the precision with which each department did its share of the work, and on the accuracy of the calculations with regard to the cost of each operation. These calculations had of necessity to be so close as to leave no margin; an error at any point might easily have involved financial loss. The scheme, fully matured, was put into operation in 1893, and worked from the outset without a hitch. To the officers of these co-operating departments King attributed the success, after thirty years of effort, of the design enunciated by Government when it introduced cinchona to India:—"To put the only medicine that is of any use in the cure of the commonest and most fatal of Indian diseases within the reach of the poorest."

In 1874 King also commenced on a definite plan, the details of which he wisely subordinated to current exigencies, a survey of the vegetation of the countries within the sphere of influence of the Calcutta garden. These include the Eastern Himalaya, Bengal, Assam, Burma, the Andaman and Nicobar Islands, and the Malayan Peninsula. His first object was to fill up gaps in the Calcutta Collection rather than to investigate afresh areas already examined; to this end he sent independent collectors to unvisited districts or attached them to military expeditions or survey parties. But

his efforts were largely aided by personal friends, and in no branch of his work was his magnetic influence more potent than in this. He imparted to officers of Government, both civil and military, to missionaries, planters and travellers some share of his own enthusiasm, and many of the most valuable additions to the Calcutta herbarium were the result of his endeavours in this direction. His multifarious duties left him few opportunities for personal travel, but he never allowed them to impede his constant supervision of the work of his botanical artists. He was thus enabled to bring together a collection of specimens and drawings far surpassing in extent and value that dispersed in 1828, and to take a considerable share in the task of supplying material for the use of Sir Joseph Hooker, while that botanist was engaged from 1872 to 1897 in preparing the 'Flora of British India.' It was therefore fitting that when, in 1891, the botanical officers serving in the different Presidencies were linked together in one department, King was appointed the first Director of the Botanical Survey of India. In this capacity he urged the necessity for the preparation of a series of local or regional floras to supplement Hooker's great work. His proposals, after being approved alike by the local governments concerned and by the Supreme Government, encountered difficulties akin to those he had experienced in connection with cinchona, so that nothing beyond what he himself could accomplish had been done in this direction when he left India in 1898. In the end these difficulties were overcome, and the work he had shown to be necessary has already been partly accomplished.

As Professor of Botany at the Medical College of Bengal, King was a lucid and effective teacher, and in the course of study to which he subjected his pupils he, with the approval of Government, effected at the outset alterations which to his practical mind seemed improvements. The course, as he found it, was modelled on those adopted in medical schools in Britain, where the teacher was either content to coach his students to the point required to enable them to pass an examination on some prescribed standard, or was prone, if enthusiastic, to endeavour to bring his pupils to some approximation to his own standard of botanical knowledge. The first method King held to be a waste of the time both of teacher and taught; the second, even if the laws of supply and demand had rendered it desirable, he found to be impossible. His students, with hardly an exception, were young men who had suffered from what he held to be the injurious incubus, a western literary education; with minds often originally bright, their natural powers of observation had been inhibited and sometimes atrophied by close attention to the written word. In consideration of the fact that the real purpose of their presence in college was to acquire a practical knowledge of surgery and medicine, he deemed it his duty to treat the subject he taught as purely ancillary to this laudable end. His teaching therefore resolved itself, not into a course of Botany in the ordinary acceptation of the term, but into a steady application of botanical facts and truths to the training of the various senses of his students. If in the end they did come to know a good deal about the subject,



this King considered a purely incidental result. The object he strove, and strove successfully, to attain was to habituate his pupils to the art of observing natural facts, and to accustom them to the ordeal of giving reasons for the faith that was in them when confronted with objects that, though similar in externals, were essentially different.

The exercise of King's business capacity was not limited to the departments which he administered. His local Government appointed him a member of the visiting Board of the Bengal Engineering College, an institution with whose objects as a technical school he was in entire sympathy, and in whose progress he took a warm and effective interest. He was appointed by its Chancellor a Fellow of the University of Calcutta, and was long a trusted member of the Senate, for a time also representing the medical faculty on the Syndicate. He represented the Supreme Government as a Trustee of the Indian Museum, an institution for which he did much important work, especially during a number of years when he was Chairman of the Trustees; from his resignation of that office till his retirement from Indian service he was Vice-chairman. When in 1894 the Government of India organised an enquiry into the indigenous drugs of the country, King was appointed Chairman of the Central Committee, and served in this capacity till he left for Europe. He took a deep interest in the welfare of the Asiatic Society of Bengal, and although he did not often accept a seat on its Council, he was always the trusted adviser of the Society's officers in matters relating to its natural history side. He was an active member of Council, and at one time President of the Agricultural and Horticultural Society of India.

It is somewhat interesting to observe that, in spite of his early distaste for business, King's public services should have derived their chief value from his remarkable business aptitude, and that although the extent and gravity of his official duties did not prevent the simultaneous prosecution of purely scientific studies, the possession of this business aptitude deprived him for many years of any opportunity of presenting ordered statements of his results. It is equally interesting to find that, as regards his scientific work, the line which he took was not that towards which his tastes naturally led. When King reached India in 1866 his botanical interests were centred on physiological and morphological problems, and especially on those connected with cryptogams. Here, again, circumstance proved stronger than predilection. The comparative poverty of the floras of Central India and Rajputana led him to expend his surplus energy in important zoological studies; during the rest of his career these were given to systematic work connected with flowering plants. His practical mind realised, from the time he took charge of the Saharanpur garden, that however enticing his favourite studies might be, the path of duty for him led elsewhere; that the immediate needs of people and Government alike demanded that every official Indian botanist should devote himself to aiding Hooker in the prosecution of his fundamental undertaking of providing recognisable descriptions of Indian phanerogams; and that until this floristic study was completed, the time for

indulging in the work he personally preferred had not yet come. His duties as a forest officer taught him how difficult and yet how essential the recognition of species that are of economic importance may be; his experience then and afterwards, when engaged in the formation of a first-rate herbarium collection, led him to realise how frequently competent field workers, whose results in obtaining material for the study of herbaceous plants or shrubs may leave nothing to be desired, are deterred by what are doubtless serious physical difficulties from supplying specimens that adequately illustrate arboreous types. His sense of the extreme importance, from the industrial standpoint, of full accounts of the constituents of the Indian forests, led him by precept and example constantly to strive to remedy this well-known defect. With all this he fully realised the desirability of advancing our knowledge of Indian cryptogams, more especially in regard to their connection with pathological problems, but he failed, for once, to convince Government how desirable it was to add a competent cryptogamist to the garden staff. He did what he could to remedy the defect by referring material to experts in Europe, and here again his personal influence was of incalculable benefit to India. A friend, Dr. Cunningham,\* devoted much of his scanty leisure to questions connected with vegetable pathology; another friend, Dr. Barclay,† was an ardent student of the life-histories of the Uredineæ. For many years these two workers dealt on King's behalf with critical references relating to the field of study which King was precluded from entering and their generous co-operation with him in the public interest only ended with the departure from India of the one and the untimely death of the other. Throughout his active career King kept himself abreast of what was done in most branches of botanical activity, but intimate friends alone were aware of the pain it gave him to observe the gradual drifting apart of workers in different lines of research. What grieved him most was the hostility, especially when this was veiled, sometimes displayed by men whose work connected with what they termed "scientific" botany he held in high regard, towards "systematic" botany. This attitude on the part of students of problems which naturally attracted himself, towards conscientious workers in the field to which circumstance and a sense of duty confined him, caused King deep distress.

The fact that King's scientific attainments were on a level with his administrative gifts, though unknown to the world at large, could not be concealed from those with whom he corresponded on botanical subjects, and in 1884 his university conferred on him the degree of LL.D., while in 1887 he was elected into the Royal Society. He had since 1874 in reality done much critical work, but it was not until 1887, when the progress made with his garden improvements and especially in connection with the manufacture of

\* D. D. Cunningham, C.I.E., F.R.S., Professor of Physiology, Calcutta, and Secretary to the Sanitary Commissioner with the Government of India.

† Arthur Barclay (1852—1891), Secretary to the Director-General, Indian Medical Service.

quinine seemed to justify the step, that King commenced the publication of important contributions to botanical literature. In that year the enlightened liberality of the Government of Bengal enabled King to found the 'Annals of the Royal Botanic Garden, Calcutta,' a series of sumptuous volumes in which he proceeded to publish amply illustrated monographs of difficult and unwieldy genera and families. The first of these deals with "the species of *Ficus* of the Indo-Malayan and Chinese countries." On this work he had bestowed the labour of much of his scanty leisure for eleven years, during which time he had examined the material preserved in every important European collection. The objects he had in view were altogether practical ones; the genus was selected because of its being largely composed of trees, many of them being of economic importance, and the monograph was primarily intended to break ground for Sir Joseph Hooker and to assist that author in subsequently dealing with its species. The work, however, is marked by such accuracy, lucidity, and completeness that it at once placed King among the foremost systematic botanists of his time, and its appearance was rapidly followed by that of equally finished works on *Quercus*, *Castanopsis*, *Artocarpus*, and *Myristica*, all prepared with the same object and selected for the same reasons. When King visited Java in 1879 he had an opportunity of seeing something of the rich vegetation of Malaya, which made on his mind an ineffaceable impression. From Singapore he paid a botanical visit to Johor, in company with his friend Archdeacon (now Bishop) Hose. He collected personally in Penang and Province Wellesley, and was subsequently able to arrange for the systematic botanical exploration of Perak. In 1886 facilities were afforded, at the request of King's friend, Sir Hugh Low, to Father Scortechini, who had also made extensive collections in Perak, to commence the preparation in the Calcutta herbarium of a flora of that State. Scortechini, unfortunately, soon afterwards died, bequeathing to the Calcutta Garden all his specimens, drawings, and notes. Sir Joseph Hooker and Sir Hugh Low now begged King himself to undertake this very urgent task, and in 1889 he commenced single-handed a floristic study of the whole Malayan Peninsula. As preliminary to the preparation of a local flora of the region—the first of the series of such floras, whose publication for the various provinces of India he was two years later officially entitled to urge—King began to issue, in the 'Journal of the Asiatic Society of Bengal,' a series of contributions intended to serve as "Materials for a Flora of the Malayan Peninsula," but prepared with such care that they form a satisfactory substitute for a final work.

Five instalments of this great undertaking, completing the *Thalamifloræ*, were issued up to 1893, but in the case of two important families, *Magnoliaceæ* and *Anonaceæ*, the study of the Malayan forms involved a careful examination of extra-Malayan material, the results of which were embodied in two great monographs simultaneously published in the garden 'Annals.' In 1895, King, having attained the age of fifty-five, was, under Indian rules, due

to retire on April 11 without being able to qualify for the pension payable after thirty years' service. In consideration of the importance of the work he had in hand, his service was extended for two years, and on July 1, 1895, he was further permitted to resign his chair at the Medical College so as to leave more time for the floristic work on which he was engaged. In 1896 with the eighth part of the 'Materials,' King completed the *Discifloræ*, and in 1897 he was granted a further extension to permit him to carry still further his Malayan work and to complete a sumptuous monograph of the 'Orchids of the Sikkim Himalaya,' of great importance to horticulture, for which he provided the text, while one of his Cinchona officers, Mr. R. Pantling, prepared the illustrations. Towards the end of 1897 his health, which since 1873 had been uniformly good, was completely undermined by a severe attack of fever, and his medical advisers peremptorily ordered the termination of his service. But before he left India on February 28, 1898, after more than thirty-two years of devoted service to the people and the Government, he had the satisfaction of seeing the issue of the orchid monograph, and had carried his Malayan work to the middle of the *Calycifloræ*, at the end of the tenth fasciculus. On reaching England, King, resumed at Kew, his work on the Malayan flora. The state of his health, however, prevented his making great progress during 1898, and in 1899, owing to his consenting to serve as President of the botanical section of the British Association at its meeting at Dover, he was able to accomplish less than he had hoped. He had, moreover, under medical advice, to spend each winter and spring on the Riviera, and soon realised that he might never finish the task he had allotted himself. He faced the contingency with characteristic practicality. By arrangement with his friend, Mr. H. N. Ridley, Director of the Singapore Botanic Garden, that botanist undertook the elaboration of the Monocotyledonous families, while King worked out the remaining Dicotyledons, and when, in 1902, with the issue of the thirteenth part, King had finished the *Calycifloræ*, he was joined by his friend, Mr. J. S. Gamble, in the elaboration of the *Corollifloræ*. For three more years King took his full share in the joint work, which now made rapid progress; after 1905 partial loss of sight and progressive infirmity led to his enforced abandonment of active participation in the task, and the only share he could take in the preparation of the twenty-first part, whose issue coincided almost to a day with his death and completed the *Corollifloræ*, was the examination of the sheets as they passed through the Press. He had, however, the satisfaction of seeing the issue in 1907 of the first portion, and the completion in 1908 of what remained of Mr. Ridley's contribution to the great undertaking begun in 1889.

King's reputation as a landscape gardener was well known; it brought him honorary association with various horticultural societies and was recognised by the award of the Royal Horticultural Society's Victoria Medal in 1901. The value of his services to humanity in connection with the

separation and especially the distribution of quinine brought him honorary membership of the Pharmaceutical Society, the grade of Officier d'Instruction publique, the gift of a ring of honour by the Czar Alexander III, and the Companionship, in 1890, of the Order of the Indian Empire. His work as a systematic botanist was also widely appreciated; he was a corresponding member of the Bavarian Academy, an honorary member of the Royal Botanic Society of Belgium and of the Deutsch Botanische Gesellschaft, one of the six honorary British Fellows of the Botanic Society of Edinburgh, and, a distinction that gratified him more than any other, an honorary member, after he left India, of the Asiatic Society of Bengal, with which he had been connected since 1867. The University of Upsala presented him with a medal in recognition of his botanical studies, and the Linnean Society, to which he had been elected in 1870, awarded him its Linnean medal in 1901. On January 1, 1898, he was, in recognition of his long and distinguished service, created a K.C.I.E., and immediately after his retirement a number of his personal friends united in obtaining a medallion portrait in bronze, which was placed, with a similar portrait of his friend, Dr. Cunningham, who for many years was Secretary to the Committee, in the Zoological Gardens which King had designed. A replica of King's portrait was placed in the Royal Botanic Garden whose beauty he had restored. At San Remo, where he wintered yearly from 1898 till his death, another memorial, connected with a public institution whose welfare he had much at heart, will bear lasting witness to his quiet but effective devotion to the cause of practical philanthropy.

King married, in 1868, Jane Anne, daughter of Dr. G. J. Nicol; during his illness in 1897 she was with him in India. As he was slowly recovering, Lady King's health gave way. On the homeward voyage she gradually sank; she died in London the day following their arrival in England. From this blow King never fully recovered; its effect became more and more apparent as the solace of strenuous work was denied him. The hæmorrhagic tendency of early life reasserted itself, and led to the rupture of a retinal vessel which deprived him of the use of an eye. The tendency steadily increased, and the melancholy induced by the feeling that his days of usefulness had ended was mercifully relieved by an apoplectic seizure to which King succumbed at San Remo on February 12, 1909. His remains were interred, as he had desired, where he died.

King's wide knowledge, which extended to most branches of science and embraced many aspects of art and literature, was accompanied by a natural modesty and a personal charm that rendered intercourse with him extremely pleasing, though literary or artistic friends rarely came to know of his scientific tastes, and scientific acquaintances had still fewer opportunities of appreciating his critical acumen. But these, and other friends outside either category, fully understood his innate goodness and courtesy, his transparent candour, his shrewd sense, and his keen but kindly wit. A wise counsellor

and an unfailing friend, he was loved by all who were privileged to know him. King's life was spent in doing with his might what his hand found to do, and if others have made more striking contributions to natural knowledge, none have rendered more self-sacrificing and devoted service to the nations of India and to the science of Botany.

D. P.

